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# A national survey on the current status of informatics residency education in pharmacy

Anthony Blash[a,*], Connie L. Saltsman[b], Condit Steil[c]

[a] Department of Pharmacy Practice, Belmont University College of Pharmacy, 1900 Belmont Blvd., Nashville, TN 37212, United States
[b] EHR Medication Management Expert Lead, HCA Management Services, L.P., 2515 Park Plaza, Building 2-4W, Nashville, TN 37203, United States
[c] Belmont University College of Pharmacy, 1900 Belmont Blvd., Nashville, TN 37212, United States

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ABSTRACT

*Background and purpose:* Upon completion of their post-graduate training, pharmacy informatics residents need to be prepared to interact with clinical and technology experts in the new healthcare environment. This study describes pharmacy informatics residency programs within the United States.

*Educational activity and setting:* Preliminary information for all pharmacy informatics residency programs was accessed from program webpages. An email was sent out to programs asking them to respond to a six-item questionnaire. This questionnaire was designed to elicit information on attributes of the program, behaviors of the preceptors and residents, and attitudes of the residency directors.

*Findings:* Of 22 pharmacy informatics residencies identified, nineteen (86%) participated. Twenty (91%) were second post-graduate year (PGY2) residencies. Ten (45%) were accredited by the American Society of Health-System Pharmacists (ASHP), while eight (36%) were candidates for accreditation. Hospital (17/22, 77%) and administrative offices (3/22, 14%) were the predominant training sites for pharmacy informatics residents. Large institutions were the predominant training environment for the pharmacy informatics resident, with 19 of 22 (86%) institutions reporting a licensed bed count of 500 or more. The median (range) number of informatics preceptors at a site was six to eight. Regarding barriers to pharmacy informatics residency education, residency directors reported that residents did not feel prepared based on the limited availability of curricular offerings.

*Discussion and summary:* In the United States, relatively few residencies are explicitly focused on pharmacy informatics. Most of these are accredited and hospital affiliated, especially with large institutions (> 500 beds).

## Background and purpose

The 1999 Institute of Medicine (IOM) report *To Err is Human*, estimated that as many as 98,000 Americans die every year from preventable medical errors. One common contributing factor arises from the fragmented nature of the health care delivery system. Patients visit multiple providers in different settings, and each provider has access to only limited portions of a patient's healthcare information portfolio. This lack of information allows errors to occur more easily. The report concludes that errors are caused by faulty systems, processes, and conditions that lead to medical errors or fail to prevent them. To make the healthcare system safer for

* Corresponding author.
*E-mail addresses:* Anthony.Blash@Belmont.edu (A. Blash), Connie.Saltsman@hcahealthcare.com (C.L. Saltsman), Condit.Steil@Belmont.edu (C. Steil).

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patients the IOM suggested that healthcare systems be redesigned to make errors less likely to occur. This redesign includes new technology tools, embedded quality, efficiencies, safety metrics and workflow, and process pathways that allow the system to continuously update as new knowledge and experience is gained. To successfully implement these systemic changes, the healthcare system needs professionals who are both clinically and technologically skilled.[1] An increase in the need for health information technology professionals is expected over the coming years because of the transformation of the American healthcare system.[2]

Pharmacy informatics is defined as the scientific field that focuses on medication-related data and its knowledge within the continuum of healthcare systems (including its acquisition, storage, analysis, use, and dissemination) in the delivery of optimal medication-related patient care and health outcomes.[3] In 2007, the American Society of Health-System Pharmacists (ASHP) issued a practice document called the *Statement on the Pharmacist's Role in Informatics*.[4] The statement affirmed four areas of responsibility for the pharmacist and the informatics pharmacist. These areas are *active participation* of pharmacists in all aspects of medical informatics, a need to take a *leadership role* in medical informatics at all levels of health care, a need to *perform research* involving the core issues of medical informatics, and a need to *develop a set of practical informatics competencies* to manage medication-related data challenges across the continuum of health care. Pharmacy informaticists are able to assist with developing a set of practical informatics competencies to manage medication-related data and information challenges across the continuum of health care.[4,5] Of note, a 2015 statement update from ASHP reported that despite a growing number of residency-trained pharmacy informaticists, there is still a clear need to build a set of core competencies for a residency-trained informatics specialist.[5]

## Educational activity and setting

### *Sample*

All pharmacy informatics programs in the United States were identified using the 2014 American Society of Health-System Pharmacists Online Residency Directory. The directory also provided email addresses for the residency program directors (RPD). Additional preliminary program information was obtained from each program's webpage. Using the program contact information, RPDs were also emailed a short questionnaire.

### *Questionnaire*

Our pharmacy informatics residency questionnaire was adapted from the Association of Directors of Geriatric Academic Programs (ADGAP) longitudinal study of training and practice in geriatric medicine.[6] This six-item questionnaire sought general program information such as the number of residents in the program, required experiences including the number of clinical days, staffing requirement and faculty resources, and one open-ended question about barriers to successful completion of objectives in the pharmacy informatics residency program. Our questionnaire was pilot-tested by two pharmacy informatics residents, three advanced pharmacy practice experiential pharmacy informatics students, and three RPDs. After the pilot test, RPDs were emailed the short questionnaire.

### *Procedures*

After all US pharmacy informatics residency programs were identified, ASHP residency accreditation status and licensed bed count information was obtained from each program's webpage. In September 2014, our questionnaire was emailed to pharmacy informatics RPDs. Follow up email reminders were sent to all non-responding residency directors every seven days after the first email, with a phone call being placed to those still not responding 21 days after the initial attempt.

## Findings

Among the 22 programs, an internet search revealed that nineteen (86%) programs required a PGY1 residency, and one (5%) reported that the PGY1 residency was preferred. Two (10%) of the residencies are two-year pharmacy informatics training programs, combining both PGY1 and PGY2 at that site.

### *Characteristics of responding residency programs*

Of 22 questionnaires, 19 programs responded (86%). The largest concentration of pharmacy informatics residencies was in the midwestern census region (as shown in Table 1). Fourteen (74%) of the training sites are reported as hospitals or health systems. However, residents were also trained at other sites such as hospital, health system, office and hospital mix, academic medical center and college of pharmacy mix, corporate office and ambulatory care hospital (also in Table 1). While the type of primary pharmacy informatics residency site varied, 21 (91%) of the residency programs were affiliated with hospitals or health systems. The residency not affiliated with a hospital occurred in an ambulatory clinic setting (< 200 beds). Among the residencies affiliated with a hospital, 18 (86%) if the institutions were large (> 500 beds) while three (14%) were medium (200–499 beds); no institutions were small (< 200 beds). Of note and according to webpage information, the three non-responding residency sites were in large institutions.